NOTICE

SPECIAL
OPEN MEETING OF THE ARIZONA CORPORATION COMMISSION

DATE: Wednesday, June 28, 1999 TIME: 9:30 a.m.

Hearing Rooms 1 and 2
Arizona Corporation Commission
1200 West Washington Street - 1st Floor
Phoenix, Arizona 85007

This shall serve as notice of a special open meeting of the Arizona Corporation Commission at the above location for consideration, discussion, and possible vote of the items on the following agenda and other matters related thereto. Please be advised that the Commissioners may use this open meeting to ask questions about the matters on the agenda; therefore, the parties to the matters to be discussed or their legal representatives are requested, though not required, to attend. The Commissioners may move to executive session for the purpose of legal advice pursuant to A.R.S. §§ 38-431.03.A.3. and/or 4. on the matters noticed herein.

The Arizona Corporation Commission does not discriminate on the basis of disability in admission to its public meetings. Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, as well as request this document in an alternative format, by contacting Cynthia Mercurio-Sandoval, ADA Coordinator, voice phone number (602) 542-0838, E-mail csandoval@cc.state.az.us. Requests should be made as early as possible to allow time to arrange the accommodations.

BRIAN C. McNEIL
Executive Secretary

ARIZONA CORPORATION COMMISSION WORKSHOP

DISTRIBUTED GENERATION & INTERCONNECTIONS

Purpose: Workshop to consider advancements in distributed generation technology and requirements for interconnection to the electric grid from an Arizona retail electric competition paradigm

AGENDA

1. Welcome
2. Workshop Overview
3. Keynote Presentation: Industry & National Perspective
4. Panel: Local Experiences

   LUNCH
5. Distributed Generation Breakout Session
6. Interconnections Breakout Session
7. Panel: The Retail Competition Paradigm
8. Where Do We Go From Here?

From: Jerry D. Smith
To: DGIWorkshop
Date: 7/20/99 12:56pm
Subject: Distributed Generation & Interconnections Update E 00000A 990431

(Please reply by E-Mail if you desire to be removed from this distribution list.)

As a Distributed Generation & Interconnections Workshop attendee or party identified as interested in being on the E-Mail list for this topic, you will find the following attachments:

1. Minutes of the 6/28/99 ACC Workshop
2. Summary notes of the 6/28/99 ACC Workshop
3. Attendance List of the 6/28/99 ACC Workshop
4. Workshop Group Breakout Session Issues

The above information is also posted on the ACC Website (www.cc.state.az.us). A docket will likely be opened for this topic in the near future. Correspondence received from parties responding to the May 27, 1999 letter soliciting issues and topics for discussion at the 6/28/99 workshop will be filed with the new docket number when it is opened.

Please note the invitation in the minutes of the workshop for those interested in participating in the DGI Workgroup formation and process to contact me by phone or E-Mail. The date for the initial DGI Workgroup meeting has not been set. A meeting date in the last half of August is being considered. ~JDS~

CC: SMO

Special Open Meeting Minutes

Date: June 28, 1999 **Time:** 9:30 A.M.

Place: Arizona Corporation Commission Hearing Rooms 1 & 2
1200 W. Washington St., Phoenix, AZ 85007

Purpose: The Arizona Corporation Commission (ACC) Utilities Division sponsored a workshop to consider advancements in Distributed Generation technology and requirements for interconnecting to the electric utility grid from a retail competition paradigm in Arizona.

Attendance: No quorum of Commissioners; Commission staff members; Maricopa County Air Quality staff members; staff from the cities of Phoenix, Scottsdale, Tempe, and Tucson; individuals representing Arizona Independent Scheduling Administrator (AISA), Residential Utility Consumers Office (RUCO), Arizona Utility Investors Association (AUIA), and Distributed Power Coalition of America (DPCA); representatives of ESPs / Utilities - APS, APS Energy Services, NEV, TEP, SSVEC, SRP, and SW Gas; and representatives of the following firms - Allied Signal, Brown & Bain, BVA Engineers, Cummins Southwest, Diversified Technical Services, ESI, ETA Engineer, Engine World, On Site Sycom Energy Corp, Phoenician Resort, RW Beck, Sierra Southwest, Snell & Wilmer, and TRW Vehicle Safety Systems; and the following private citizens - Larry Holly, Dimitros LaLaudaus, Tim McDonald, Scott McLellan, Douglas Nelson, Gerald Paulos, and Sean Seitz.

Workshop Overview: The workshop began by establishing a "state of the art" point of reference regarding DG and technical requirements for interconnecting with the electric utilities systems. Secondly, the workshop considered how DG might function within a restructured electric utility industry offering open access for retail energy transactions in Arizona. These first two workshop objectives were achieved by discussions of two diverse groups of panelist. Finally, the identification of concerns that may warrant regulatory consideration was accomplished by using a group breakout exercise. Notes of these workshop activities are provided as an Attachment.

Action Plan: Critical issues emerging from the workshop will be packaged and assigned to a Distributed Generation & Interconnections (DGI) Working Group. Formation of the DGI Working Group will be accomplished by individuals notifying Jerry Smith of the ACC Utilities Division (602-542-7271 or JSMITH@CC.STATE.AZ.US) of their interest in participating. Attendance is open to anyone that desires to participate but working group membership will be limited to one or two individuals per organization. As issues become more clearly defined they may be assigned to subcommittees for resolution. A report of recommendations will be assembled for ACC consideration by year-end, 1999.

Meeting Adjourned at 4:20 PM

Recorded By: Jerry D. Smith, P.E., Utilities Division, Arizona Corporation Commission

Workshop Notes

Date: June 28, 1999 **Time:** 9:30 A.M.

Place: Arizona Corporation Commission Hearing Rooms 1 & 2
1200 W. Washington St., Phoenix, AZ 85007

Attendees: List provided as an attachment

Purpose: The Arizona Corporation Commission (ACC) Utilities Division sponsored a workshop to consider advancements in Distributed Generation technology and requirements for interconnecting to the electric utility grid from a retail competition paradigm in Arizona.

Background: Ray Williamson, acting ACC Utilities Division Director, opened the meeting by giving some background concerning electric rule making for retail competition in Arizona. The fact that the proposed rules are silent regarding Distributed Generation (DG) prompted the ACC to host the June 28th workshop. It is generally felt that specific consideration of DG does not present sufficient cause to delay electric competition further in Arizona. Rather, the workshop is considered to be a forum for starting a process to consider the topic of DG.

Keynote Address: Sarah McKinley, Executive Director of Distributed Power Coalition of America, provided an informative national overview of state and federal initiatives impacting electric utility restructuring for retail competition, applications of DG, and associated interconnection standards. Some of the initiatives have been under development and consideration for sometime while others have just recently been proposed. Nevertheless, a broad range of work has proceeded on the national front and in numerous other states that will serve as excellent references as the State of Arizona considers its future accommodation of DG technology.

Panel A (Local Experiences): was comprised of panelist representing three view points: the DG provider community, utility distribution companies, and consumers with actual distributed generation projects. This panel considered the current status of DG technology, three actual DG projects in Arizona and the overall DG operational experience of the Arizona utilities.

The commercial and industrial segments of the retail consumer market are currently the primary target for application of natural gas DG technology. Customers with thermal needs are good candidates for co-generation. Applications of solar and photovoltaic DG technologies are more prevalent in residential settings. Mass production of micro-turbines and fuel cell technology is likely to reshape the focus of the DG industry in the near future. Significant hours of operation are needed in which to spread the capital cost of DG technology. Provisions for fuel delivery systems and associated cost must also be taken into consideration. Fair rates are needed for standby and emergency power.

The Phoenician Resort co-generation project, the Bonita Nursery emergency and peak shaving generators north of Willcox, and Bob's Auto Spa in Tucson were represented on the panel. These DG projects indicated excellent operational interface experiences with the respective local utility. They highlighted operational concerns regarding fluctuating and escalating fuel prices and power quality issues such as the presence of third harmonics. An experienced and trained operator and maintenance crew is vital to successful operation of these projects.

The utilities reported a wide array of DG applications including wind generators; fuel cells, small hydro units on canals; a landfill plant; and numerous solar, photovoltaic, and diesel/gas fueled units. Safety remains a key concern coupled with concerns regarding transfer switches used to connect the units whether on or off the grid. While development of national interconnection standards are needed and will be helpful there will always be a need to consider site specific issues. Proper pricing mechanisms for interconnecting DG in the restructured utility industry still need attention. Utilities reported that in some cases the DG operator has leaned on the utility for expertise in operating their units. Based upon DG projects constructed and no longer operational, utilities are concerned about the uncertainty and long term viability of DG projects when planning delivery system improvements. There may also be a need to correlate DG uses and local must-run generation requirements for scheduled retail transactions.

Panel B (Retail Competition): was comprised of panelist representing three views: the jurisdictional and regulatory community, retail market advocates, and restructured utility organizations. This panel considered standards and jurisdictional requirements affecting siting and interconnecting DG to the utility; the framework of retail electric competition in Arizona; and consumer issues unique to DG applications.

The ACC rules require filing of an application with the State Power Plant and Line Siting Committee when siting generation units of 100 MW or greater in Arizona. Existing DG installations have been addressed by local jurisdictions on a case by case basis. It was suggested that complete DG systems be certified so local jurisdictions can expedite permitting. Who should certify such systems was not resolved. Industry standards for interconnection of DG are under development by IEEE, ANSI and several states. Some of these standards will not be completed until 2001.

Retail competition in Arizona is being managed via use of an Arizona Independent Scheduling Administrator (AISA) as an interim step to implementation of an Independent System Operator (ISO). These organizations are required by proposed ACC rules and by a recent FERC Notice of Proposed Rulemaking (NOPR) for Regional Transmission Organizations (RTO). Scheduling Coordinators are used to submit balanced schedules of customer loads and associated Electric Service Provider resources to respective Control Area Operators/Transmission Providers. These schedules are submitted in 1 MW increments on an hourly basis.

Rates applicable to DG selling to the grid are a concern. It was also suggested DG should be differentiated from Demand Side Management since it actually supplies the grid in

some cases. The correlation of DG and system ancillary services or generating reserve requirements was also stated as a concern.

The future looks quite different from the past. ESP's will eventually be able to dispatch specific customers' lights, HVAC, residential appliances, etc. This implies decisions will be made using real time information at the customer level instead of at the control area operator level. Inclusion of DG technologies in this new dispatch arena creates what some have called "virtual utilities." Hourly metering will become a necessity for such systems.

Breakout Groups: Attendees were split into two breakout groups to explore issues and concerns in more detail. One group addressed issues related to implementation of DG units and the other group addressed interconnection with the utility grid. A summary of the issues documented by this process is provided as an attachment.

Meeting Adjourned at 4:20 PM

Recorded By: Jerry D. Smith, P.E., Utilities Division, Arizona Corporation Commission

Attachments: List of Attendees
Group Breakout Session Issues

ACC DGI Workshop

List of Attendees

DON ADAMS
TEP

ROBERT ARPIAO
MARICOPA COUNTY AIR QUALITY

PHILLIP ASBURY
SSVEC

PREM BAHL
RUCCO

ROBERT BALTES
BVA

JAMES BARRY
TEP

BOB BAXTER
BVA ENGINEERS

STEVE BISCHOFF
APS

JANA BRANDT
SRP

ROBERT BROWN
SIERRA SOUTHWEST

MIKE BURKE
NEV TECHNOLOGIES

MIKE BUSQUAERT
PHOENICIAN RESORT

PHIL CEA
APS

CHUCK CULLOM
SW WIND POWER

GREG CZAPLEWSKI
CUMMINS SOUTHWEST

KEITH DAVIDSON
ON SITE SYCOM ENERGY CORP

LEE DEBAILLE
MARICOPA COUNTY

CHUCK DECORSE
TEP

WILLIAM DELONG
SOUTHWEST GAS

RANDY DESPAIN
CITY OF PHOENIX

DAVID T. DRUMMOND
NEV

REBECCA EICKLEY
CITY OF SCOTTSDALE

CHARLES EMERSON
TRICO

DANIEL FITCHITT
CITY OF TEMPE

RON FRANQUERO
ACC

TOM FRIDDLE
APS

LANE GARRETT
ETA ENGINEERING INC

DENNIS GERLACH
SRP

B T GERNET
APS

ED GESEKING
SOUTHWEST GAS

ELENA GORELLE
MARICOPA COUNTY

JEFF GULDNER
SNELL&WILMER

TOM HANSEN
TEP

BOB HESS
SALT RIVER PROJECT

LARRY HOLLY

MIKE HOUSLEY
APS ENERGY SERVICES

ACC DGI Workshop

List of Attendees

VINNIE HUNT
CITY OF TUCSON

JEFF JACOBSON
SOUTHWEST GAS

BARBARA KEENE
ACC

BARBARA KLEMSTINE
APS

DIMITROS LALAUDAUS

RICK LARUBETH
APS

SCOTT McCULLOUGH
MARICOPA COUNTY PLANNING DIV

TIM McDONALD

SARAH MCKINLEY
DISTR. POWER COALITION OF AMERICA

SCOTT McLELLAN

MATT MEDVRA
ESI

W W MEEK
AUIA

PATTI MORRIS
TEP

BILL MURPHY
CITY OF PHOENIX

DOUGLAS NELSON

DAVE NIZHOLE
TRW VEHICLE SAFETY SYSTEMS

BRIAN O'DONNELL
SOUTHWEST GAS

DAN PARMLER SR
DIVERSIFIED TECHNICAL SVCS

MICHAEL PATTEN
BROWN & BAIN

GERALD PAULOS

MATT PUFFER
ENGINE WORLD

RANDY SABLE
SOUTHWEST GAS

EDWARD SALGIAN
BVA

STEVE SCHMOLLINGER
TEP

RICK SCHUMM
SRP

MIKE SCWINDENHAMMER
SSVEC

SEAN SEITZ

MARK SKOWRONSKI
ALLIED SIGNAL

JERRY SMITH
APS

JERRY SMITH
ACC

BOB SMITH
APS

PAUL TAYLOR
RW BECK

DAVID TOWNLEY
NEV TECHNOLOGIES LLC

LAUREL WHISLER
AZ INDEP. SCHEDULING ADMIN ASSOC

RAY WILLIAMSON
ACC

ACC DGI Workshop

Group Breakout Session Issues

Safety

1. Ensure Protection of Workers / Customers
2. Safe Practices for Connection / Isolation of Distributed Generation to / from System
3. Training and Certification / Licensing Process for Workers
4. Standardized Safety Requirements Conforming to NEC / OSHA, etc.
5. Zero Tolerance on Unsafe Conditions
6. Distinguish Safety Requirements for Large vs. Small Customer Applications

Siting

1. Size Thresholds for Which Siting Is a Public Issue
2. Tracking / Mapping of Distributed Generation for UDC Capacity Planning
3. Who Pays for Underutilized Distribution Facilities Resulting From Distributed Generation Siting

Certification / Permitting

1. Certification of Distributed Generation System Package
2. Who has Jurisdiction Over
   - Tariffs, Cost Shifting
   - Grid Access
   - Reliability

ACC DGI Workshop

Group Breakout Session Issues

Distributed Generation Fuel Requirements

1. Is a Fuel Preference Policy Needed (Gas, Solar, Wind, H_2, etc.)
2. Is a Fuel Pressure Standard Needed for Distributed Generation
3. Who Pays For Fuel Delivery Infrastructure
4. Delivery of H_2 as By Product of Fuel Cell Application

Location and Types of Distributed Generation Connections

1. Consider Standards for Inverter vs. Synchronous Connections
2. Should Standards Distinguish Between Transmission, Distribution, and Customer's Service System Connections
3. Can a Location Match be Achieved for Mutual Benefit of Customer and UDC
4. Application Process Standardized and Streamlined
5. Must be an Electric Service Provider to Re-Sale?

Points of & Types of Interconnection

1. UDC's Total Control a Concern - Jurisdiction of All Utilities (Including SRP) for Interconnections
2. Standardize Equipment for Monitoring and Verification of Interconnection
3. Site Specific Considerations vs. Interconnection Standards
4. Parallel vs. Islanded Operations of Distributed Generators
5. Is There a Distributed Generator Size Limit for Particular Interconnections

ACC DGI Workshop

Group Breakout Session Issues

Power Quality

1. Distributed Generation Compliance with WSCC / NERC / IEEE and Industry Standards
2. Power Factor, Harmonics, Voltage Flicker, Frequency and Voltage Control Concerns
3. Bilateral Power Quality Impacts of Distributed Generators, Utilities and Other Customers
4. How to Monitor and Enforce

Operational Interdependence

1. How will Distributed Generator Customers Contribute to Ancillary Service Requirements
2. Interface Equipment Must Provide Bilateral (Mutual) Protection / Voltage Control
3. System Dispatch / Control for Mutual System Benefit
4. Management of / Response to Disturbances
5. More Complex Operational Requirements When Many Distributed Generators Co-exist
6. Customers Reliance on Utility for Operational and Engineering Expertise

System Dynamics

1. Automatic Voltage Regulation / Power System Stabilizer / Unit Testing Requirements
2. Distributed Generator Load Following Capability
3. Real-time Pricing Affect on System Dispatch and Operation
4. Automation via Supervisory Control And Data Acquisition

ACC DGI Workshop

Group Breakout Session Issues

Operational Controls

1. Who Should Control Distributed Generator - Customer vs. Control Area Operator
2. Should Manual or Automatic Controls Be Used
3. Customer Issue: Controls Need To Follow Load To Maximize Investment
4. If Control Area Operator Dispatches Unit - Standards for Control & Telemetry Equipment Interface
   - Voltage Control
   - Power System Stabilizer
   - Governor Response (Frequency)
   - Dynamic Signal if Regulating or Load Following
5. If Utility Benefits From Dispatch of Units - How is Customer Compensated

Telemetry

1. Telemetry Required For Parallel Operation (Sell Back)
2. Distributed Generator Telemetry to Send Real Time Data to Control Area Operator
3. Transfer Tripping Distributed Generator for Disturbance on Distribution System
4. Who Owns the Information / with Whom is Information Shared
5. Who Pays the Cost for Telemetry
6. Is Net Metering Allowed

ACC DGI Workshop

Group Breakout Session Issues

Protection Requirements

1. Uniform Standards or Utility Specific
2. Balance Economics / Safety
3. How Much Control Should Utility Have In Defining Requirement
4. Dependent Upon Unit Size and Location in System
5. Define by Type of Unit and Type of Utility Interconnection

Other Issues / Concerns

1. Environmental
2. Customer Education
3. Who has Jurisdiction - ACC vs. FERC, ISO, Local, etc.
4. Scheduling Requirement
5. Pricing - Rates / Incentives
   - Utility Tariffs - Backup, Stand-By, Supplemental, Emergency, Buy-Back
   - Cost -Shifting - Who Pays Cost of Departing Customer
   - Should Distributed Generation be Allowed to Bypass Wires Charges
   - Monetary Compensation for Grid Benefits of Distributed Generation
   - Providing Opportunity / Encouragement for Smaller Distributed Generation (i.e. Residential)
   - Should ACC Provide Incentives for some Distributed Generation, if Cost Increases for Others, But Overall Cost is Reduced